

SECTION 06610 - GLASS FIBER AND RESIN FABRICATIONS, GENERAL

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing products fabricated from fiberglass reinforced plastic (FRP) and bolts, nuts, washers, supports, and accessories.
- B. The WORK also provides quality standards for all fabricated fiberglass reinforced plastic equipment of this Section and any other Section containing FRP equipment.
- C. The WORK also requires that one manufacturer accepts responsibility for the WORK as indicated but without altering or modifying the CONTRACTOR'S responsibilities under the Contract Documents.
- D. The WORK also includes coordination of design, assembly, testing, and installation.

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NTS: The WORK of this Section applies to the WORK of the following Sections:

- 1. Section 11231 Circular, Center-feed Clarifier
- 2. Section 11234 Rectangular Chain and Flight Clarifiers
- 3. Section 11292 Slide/Stop Gates
- 4. Section 11398 Dissolved Air Flotation Thickeners
- 5. Section 13209 Fiberglass Reinforced Plastic Tanks
- 6. Section 13215 Underground Storage Tanks
- 7. Section 13251 Activated Carbon Odor Control Systems
- 8. Section 13252 Chemical Odor Control Systems
- 9. Section 15161 Parshall Flumes

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1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.
 - 1. Section 05500 Miscellaneous Metalwork
 - 2. Section 09800 Protective Coating
 - 3. Section 11000 Equipment General Provisions
 - 4. Section 13300 Instrumentation and Control
 - 5. Section 15000 Piping Components
 - 6. Section 15880 Air Distribution Devices and Accessories
 - 7. Section 16040 Electric Motors
 - 8. Section 16050 Basic Electrical Materials and Methods

1.3 CODES

[DECEMBER 1995]

[CONTRACT NO.]-[CONTRACT TITLE]

GLASS FIBER AND RESIN
FABRICATIONS, GENERAL
06610-1

- A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:

1. Uniform Building Code
2. Uniform Mechanical Code
3. Uniform Fire Code
4. National Electrical Code

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NTS: For any major fiberglass fabrication items, such as tanks, vessels, troughs, flumes, gates, ducts, weirs, etc. the DESIGN CONSULTANT should typically obtain the services of an independent registered structural engineer (FRP engineer) specializing in fiberglass materials to prepare specific design instructions and detailed specifications during design, unless the DESIGN CONSULTANT has inhouse expertise in this discipline.

The following are suggested guidelines for selection of the FRP engineer.

1. The FRP engineer should be engaged full time in the design, inspection, and testing of FRP equipment and products, and must not be in the business of fabricating or supplying equipment.
2. The FRP engineer firm must have performed design services on at least one facility of comparable size and complexity in the recent past.
3. The FRP engineer firm must provide references on its related previous service, including client, contract name, telephone number, equipment type, and brief list of services performed.
4. The FRP engineer must demonstrate proficiency in use of lamination theory method of determining physical properties and analyzing stresses in FRP composites.
5. The FRP engineer must demonstrate a working knowledge of the physical properties of different FRP laminate types and materials.
6. The FRP engineer firm must have sufficient qualified staff to perform the design and subsequent inspection work in a timely manner.

The FRP engineer and/or DESIGN CONSULTANT shall provide the following engineering services relative to requests by CONTRACTORS to recognize a manufacturer or fabricator of fiberglass products as "or equal".

1. Evaluation of staff, facilities, fabrication capabilities, quality control procedures, and quality of previous work of prospective fabricators submitted by the CONTRACTOR for approval.
2. Periodically observe fabrication.

3. Observe installation for compliance with the Specifications.
4. Conduct final inspection.
5. Observe field testing.
6. Instruct the OWNER'S personnel on maintenance and repair of fiberglass structures.

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1.4 SPECIFICATIONS AND STANDARDS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

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| 1. | NBS PS 15 | Custom Contact-Molded Reinforced Polyester Chemical-Resistant Process Equipment |
| 2. | ASTM A 325 | Specification for High-Strength Bolts for Structural Steel Joints |
| 3. | ASTM A 490 | Specification for Heat-Treated Steel Structural Bolts 150 ksi (1035 MPa) Tensile Strength |
| 4. | ASTM C 581 | Practice For Determining Chemical Resistance of Thermosetting Resins Used in Glass Fiber Reinforced Structures, Intended for Liquid Service |
| 5. | ASTM D 638 | Test Method for Tensile Properties of Plastics |
| 6. | ASTM D 695 | Test Method for Compressive Properties of Rigid Plastics |
| 7. | ASTM D 790 | Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials |
| 8. | ASTM D 883 | Definitions of Terms Relating to Plastics |
| 9. | ASTM D 2563 | Recommended Practice for Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts |
| 10. | ASTM D 2583 | Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor |
| 11. | ASTM D 2584 | Test Method for Ignition Loss of Cured Reinforced Resins |
| 12. | ASTM D 3299 | Specification for Filament-Wound Glass Fiber Reinforced Thermoset Resin Chemical-Resistant Tanks |
| 13. | ASTM D 3467 | Test Method for Carbon Tetrachloride Activity of Activated Carbon |
| 14. | AISC | Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings |

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| 15. | NFPA 255 | Method of Test for Surface Burning Characteristics of Building Materials |
| 16. | ANSI/AWS D1.1 | Structural Welding Code -- Steel |
| 17. | ANSI/AWWA F101 | Contact-Molded, Fiberglass-Reinforced Plastic Wash Water Troughs and Launderers |
| 18. | ANSI/AWWA F102 | Matched-Die-Molded, Fiberglass-Reinforced Plastic Weir Plates, Scum Baffles and Mounting Brackets |

1.5 OWNER'S MANUAL

- A. The following shall be included in the OWNER'S MANUAL in compliance with Section 01300:
 - 1. Maintenance and repair instructions for fiberglass work.
 - 2. Name, address and telephone number of fiberglass fabricators and manufacturers.
 - 3. Certificate of compliance with the specifications and requirements of all fiberglass items of the WORK.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. **General:** Only products certified as complying with the indicated requirements shall be provided.
- B. **Products:** All items shall be new, of current design, from reputable manufacturers specializing in such products.
- C. **Manufacturer's Recommendations:** Products shall be recommended by the manufacturer for the application indicated.

2.2 GENERAL REQUIREMENTS

- A. **Quality:** Fiberglass items shall be constructed of new, filament-wound or fiberglass-fabric-reinforced polyester resin laminate material of the strength, thickness, and dimensions indicated, using the matched die-molded or contact molded method.
- B. **Finish:** Finished surfaces of fiberglass items and fabrications shall be smooth, resin-rich, free of voids, without dry spots and unreinforced areas, corrosion resistant and without exposed glass fibers.
- C. **Supports and Fasteners:** Bolts, anchor bolts, washers and supports shall be fabricated of Type 316 stainless steel, unless otherwise indicated.

NTS: The Specifier shall insert below a detailed specification from the FRP engineer, covering all pertinent requirements for materials, workmanship, and quality control, to obtain a high quality product.

He shall then verify that the information in the following paragraphs agrees with paragraph 2.3.

2.3 QUALITY CONTROL

- A. [FRP engineer to complete]

2.4 FIBERGLASS TROUGHS

- A. **General:** Fiberglass troughs shall comply with ANSI/AWWA F101. Fiberglass troughs shall be provided for each filter. Each trough shall have a half-rounded bottom designed for collection of backwash water at the rate of approximately [] gpm per trough. The minimum size of each trough shall be [] inches wide by [] inches total depth. An integrally-molded waterstop shall be provided on the discharge end of the trough. The back end of the trough shall be integrally-closed with fiberglass, and shall have provision for bolting against the filter wall.
- B. **Construction:** The minimum trough wall thickness shall be 1/4-inch. Troughs shall be reinforced with triangular-shaped longitudinal stiffeners, molded as an integral part of the trough. Care shall be exercised in fabricating, to maintain the edges of the troughs level and straight throughout the entire length. Troughs shall include horizontal reinforcement (spreaders) recommended by the manufacturer.
- C. **Color:** Troughs shall be constructed with a blue-green color integral with the material. Up to 4 percent by weight of thixotropic agent may be added to the polyester resin as required to prevent runoff.
- D. **Chemical Resistance and Physical Properties:** Chemical resistance and minimum physical requirements shall comply with ANSI/AWWA F101.

2.5 ADJUSTABLE FIBERGLASS WEIR PLATES AND SCUM BAFFLES

- A. **General:** Weir plates and scum baffles and mounting brackets shall conform to the requirements of ANSI/AWWA F102.
- B. **Construction:** Adjustable fiberglass weir plates shall be of a blue-green color integral with the material. Weir plates shall have notches as indicated, and all cut edges shall be resealed. Weir plates shall include slotted holes for vertical adjustment as indicated.
- C. **Chemical Resistance and Physical Properties:** Chemical resistance and physical properties of weir plates and scum baffles shall comply with ANSI/AWWA F102.
- D. **Thermal Expansion:** Coefficient of thermal expansion of weir plates and scum baffles shall be 10×10^{-6} inch per inch per degree F (average).

2.6 FIBERGLASS GRATING

- A. **Construction:** Fiberglass grating shall be minimum one inch high with one inch by 4-inch grid, or 1-1/2 inch high with 1-1/2 inch by 6-inch grid, and cut edges shall be resealed. The maximum deflection under design load (200 psf) shall not exceed 1/8-inch at 24-inch span. Fiberglass grating shall have a permanently slip-resistant surface. Cut edges and openings shall be banded.

2.7 MANUFACTURERS

- A. Products of the type or model (if any) indicated shall be manufactured by one of the following (or equal):

1. Fiberglass Troughs:

F.B. Leopold Co.
Warminster Fiberglas Co.

2. Adjustable Fiberglass Weir Plates:

F.B. Leopold Co.
Warminster Fiberglas Co.

3. Fiberglass Grating:

Fibergrate Corp., "Fibergrate"
Chemical Proof Corp., "Chemi-Grate"

PART 3 -- EXECUTION

3.1 INSTALLATION

- A. Fiberglass troughs shall be fabricated and installed with edges level and straight. In no case shall the variation in level exceed 1/16-inch above, nor 1/8-inch below the established grade. Weir plates shall be installed plumb and level. Cut edges shall be sealed.
- B. Products shall be installed in accordance with the manufacturer's installation instructions.

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NTS: The Specifier shall insert here any additional information about execution, which the FRP engineer feels necessary for this project.

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** END OFSECTION**